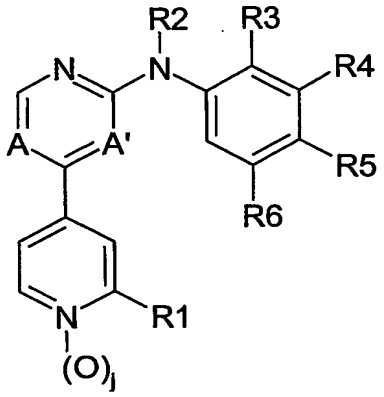
CLAIMS

1. A method of controlling and preventing an infestation of crop plants by phytopathogenic microorganisms, which comprises the application to the plant or parts of plants or to the locus thereof as active ingredient an N-phenyl-[(4-pyridyl)-azinyl]-amine derivative of the formula I



(I)

wherein

A and A' are both N or A and A' are both CH or A is CH and A' is N;

j is 0 or 1

R_1 is

a) hydrazino, that is unsubstituted or one- to threefold substituted by optionally substituted alkyl and/or optionally substituted acyl,

b) cyclohexylamino, tetrahydro-4H-pyranyl-4-amino, pyrrolidine-3-amino, 2- or 3-tetrahydro- furylamino, all optionally substituted by amino, hydroxy, alkoxy, alkyl or alkoxyalkyl,

c) piperazinyl that is optionally substituted by amino, amino-lower alkyl, hydroxy, alkoxy, alkyl or alkoxyalkyl,

d) morpholinyl that is optionally substituted by amino, amino-lower alkyl, hydroxy, alkoxy, alkyl or alkoxyalkyl,

e) amino or mono- or di-(lower alkyl)amino wherein the lower alkyl moieties are unsubstituted or substituted by one or more (preferably 1 to 3, especially 1 or 2) substitutents independently selected from the group consisting of unsubstituted amino, N-mono- or N,N-di-(lower alkyl)-amino, (lower alkoxy)-lower alk-oxy, lower alkoxycarbonylamino, hydroxy-lower alkoxycarbonylamino, lower alkoxy-lower alkoxycarbonylamino, morpholinyl, hydroxy-lower alkylamino, cyano,

halogen, oxo, hydroximino, alkoximino, optionally substituted hydrazono, lower alkenyl, lower alkynyl, guanidyl, lower alkanoylamino, hydroxy-lower alkanoylamino, lower alkoxy-lower alkanoylamino, halo-lower alkanoylamino, lower alkylaminocarbonylamino, hydroxy-lower alkylaminocarbonylamino, lower alkoxy-lower alkylaminocarbonylamino, amidino, di-lower-alkylamino-cyclohexyl, carboxy, lower alkoxycarbonyl, hydroxy-lower alkoxycarbonyl, lower alkoxy-lower alkoxycarbonyl, lower alkylcarbonyldioxy (= lower alkoxycarbonyloxy), hydroxy-lower alkoxycarbonyloxy, lower alkoxy-lower alkoxycarbonyloxy, lower alkanoyloxy, halo-lower alkanoyloxy, hydroxy-lower alkanoyloxy, lower alkoxy-lower alkanoyloxy, carbamoyl, N-mono- or N,N-di-lower alkylcarbamoyl, N-(hydroxy-lower alkyl)carbamoyl, N-lower alkyl-N-hydroxy-lower alkyl-carbamoyl, N,N-di-(hydroxy-lower alkyl)-carbamoyl, N-hydroxy-carbamoyl, hydroxy, lower alkoxy, lower alkenyloxy, lower alkinyloxy, lower haloalkoxy, lower alkylthio, lower alkylsulfoxyl, lower alkylsulfonyl, lower alkoxysilyl, 4-tetrahydro-4H-pyranyl, 3-pyrrolidinyl, 2- or 3-tetrahydrofuryl, 2- or 3-dihydrofuryl, piperazinyl, lower alkanoyl-piperazinyl (including formylpiperazinyl), optionally substituted heteroaryl and optionally substituted heteroaryloxy,

f) optionally substituted alkanoylamino, optionally substituted alkenoylamino, optionally substituted alkynoylamino, optionally substituted mono- or di-alkylaminocarbonylamino, optionally substituted alkoxycarbonylamino, optionally substituted mono- or di-alkylaminosulfonylamino, optionally substituted mono- or di-alkylaminosulfoxylamino,

g) N-(optionally substituted alkyl)-N-(optionally substituted lower alkanoyl)-amino,

h) N-(optionally substituted alkyl)-N-(optionally substituted alkoxycarbonyl)-amino,

i) N-(optionally substituted alkyl)-N-(N′,N′-mono- or di-[optionally substituted alkyl]-aminocarbonyl)-amino,

j) N=C(R_7,R_8) wherein R_7 is hydrogen, alkyl, amino, mono- or di-alkylamino and R_8 is amino, mono- or dialkylamino or wherein R_7 and R_8, together with the binding carbon atom, form a saturated five- to seven-membered ring with 0, 1 or 2 ring nitrogen atoms that is optionally substituted by one or more substituents, preferably 1 to 3 substituents, especially lower alkyl,

k) an optionally substituted 4 to 7 membered heterocyclyl group containing one or two nitrogen, oxygen or sulfur atoms but at least one nitrogen atom through which the heterocyclyl ring is attached to the remainder of the molecule;

R_2 is hydrogen, C_1-C_4-alkyl, C_3-C_4-alkenyl, C_3-C_4-alkynyl, $-CH_2OR_{16}$, $-CH_2SR_{16}$, $-C(O)R_{16}$,$-C(O)OR_{16}$, SO_2R_{16}, SOR_{16} or SR_{16}

where R_{16} is C_1-C_8-alkyl, C_1-C_8-alkoxyalkyl, C_1-C_8 haloalkyl or phenylC_1-C_2-alkyl, wherein the phenyl may be substituted by up to three groups selected from halo or C_1-C_4-alkyl;

R_3 is hydrogen, halogen, C_1-C_4alkyl, C_1-C_4haloalkyl, C_1-C_4haloalkoxy; hydroxy, mercapto, cyano or C_1-C_4alkoxy;

R_4, R_5 and R_6 are independently of each other hydrogen, halogen, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted aryl, optionally substituted heteroaryl, optionally substituted alkoxy, optionally substituted acyloxy, optionally substituted alkenyloxy, optionally substituted alkynyloxy, optionally substituted aryloxy, optionally substituted heteroaryloxy, optionally substituted acylamino, optionally substituted thioalkyl, $COOR_{17}$, $CONR_{18}R_{19}$, $S(O)_kR_{20}$, $SO_2NR_{21}R_{22}$, $NR_{23}R_{24}$, $NR_{25}SO_2R_{26}$, NO_2, CN, $C(=O)R_{27}$, $C(=NOR_{28})R_{29}$ or R_4 and R_5 or R_5 and R_6 together form a five to six – membered saturated or unsaturated carbocyclic ring system or ring system or a five to six –membered heteroaromatic or heterocyclic ring system which is optionally substituted and contains one to three heteroatoms selected from O, N or S;

k is 0, 1 or 2 and

R_{17}, R_{18}, R_{19}, R_{20}, R_{21}, R_{22}, R_{23}, R_{24}, R_{25}, R_{26}, R_{27}, R_{28} and R_{29} are independently H or optionally substituted alkyl or optionally substituted aryl; or a salt thereof

provided that when A is CH, A' is N and R_3, R_5 and R_6 are all H then R_4 is not hydrogen, halogen, alkoxy, haloalkyl, haloalkoxy or alkyl; and that when A is CH and A' is N then R_1 is not an optionally substituted N-linked 5- or 6- membered heterocyclyl group containing two adjacent nitrogen atoms as the only heteratoms in the heterocycyclic ring.

2. A method according to claim 1 wherein A is CH, A' is N and j is 0.

3. A method according to claim 1 or claim 2 wherein R_1 is

a) hydrazino substituted by one to three substituents independently selected from the group consisting of C_{1-4} alkyl, C_{1-4} haloalkyl, C_{1-4} hydroxyalkyl, C_{1-4} alkoxyC_{1-4} alkyl and C_{1-4} acyl;

b) cyclohexyl-amino substituted by amino;

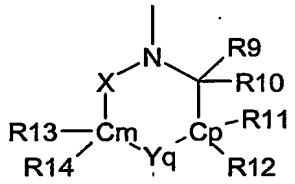
c) piperazinyl optionally substituted by one or two C_{1-4} alkyl, acyl or C_{1-4} aminoalkyl groups;

d) morpholinyl optionally substituted by one or two C_{1-4} alkyl, acyl or C_{1-4} aminoalkyl groups; mono- or di-(lower alkyl)-amino;

e) mono- or di-(lower alkyl)-amino where the lower alkyl moieties are independently substituted by N-mono- or N,N-di-(lower alkyl)amino, (lower alkoxy)-lower alkoxy, caboxy-lower alkyl, lower alkoxy, hydroxy, hydroxy-lower alkylamino, lower alkylamino-carbonylamino or lower alkoxycarbonylamino or C_{1-8} alkoximino;

j) $N=CR_7R_8$ where R_7 and R_8 together with the carbon atom to which they are attached form a five- to seven-membered ring with 2 ring nitrogen atoms adjacent to the carbon atom double bonded to the external N atom;

k) the moiety



wherein

the sum of (m + p) together is 0, 1, 2 or 3;

q is 0 or 1, and the sum of (m + p + q) together is 1, 2, 3 or 4;

R_9 is hydrogen, C_1-C_6-alkyl, C_1-C_6-haloalkyl or C_1-C_6-alkoxy;

R_{10} is hydrogen, C_1-C_6-alkyl, C_3-C_4-alkenyl or C_3-C_4-alkynyl;

each of R_{11}, R_{12}, R_{13} and R_{14} is, independently of the others, hydrogen, C_1-C_6-alkyl, C_1-C_6-haloalkyl, hydroxy-C_1-C_6-alkyl or C_1-C_6-alkoxy-C_1-C_6-alkyl, or the ring members $CR_{13}R14_4$ or $CR_{11}R_{12}$ or CR_9R_{10} are independently of each other a carbonyl group (C=O) or a group C=S;

X is C=O, C=S, S=O or O=S=O;

Y is O, S, C=O, CH_2, -N(R_{15})-, -O-N(R_{15})- , -N(R_{15})-O- or -NH-; and

R_{15} is C_1-C_8-alkyl, C_1-C_8-alkoxyalkyl, C_1-C_8 haloalkyl or phenylC_1-C_2-alkyl wherein the phenyl may be substituted by up to three groups selected from halo or C_1-C_4-

alkyl.

4. A method according to any preceding claim wherein R_2 is hydrogen, C_3-C_4-alkenyl, C_3-C_4-alkynyl, -CH_2OR_{16}, CH_2SR_{16}, -C(O)R_{16} ,-C(O)OR_{16}, , SOR_{16} or SR_{16} where R_{16} is as defined in claim 1.

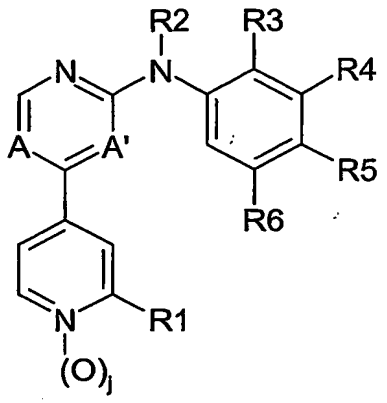
5. A method according to any preceding claim wherein R_3 is H, OH, halogen, methyl, ethyl, methoxy, ethoxy or CN.

6. A method according to any preceding claim wherein R_4 is hydrogen, halogen, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkinyl, optionally substituted alkoxy, optionally substituted alkenyloxy, optionally substituted alkynyloxy, optionally substituted thioalkyl optionally substituted aryl, $COOR_{17}$, $CONR_{18}R_{19}$, $S(O)_kR_{20}$, $SO_2NR_{21}R_{22}$ or $NR_{23}R_{24}$ where R_{17}, R_{18}, R_{19}, R_{20}, R_{21}, R_{22}, R_{23} and R_{24} are H or C_{1-4} alkyl.

7. A method according to any preceding claim wherein R_5 is hydrogen, halogen, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkinyl, optionally substituted alkoxy, optionally substituted alkenyloxy, optionally substituted alkynyloxy, optionally substituted thioalkyl optionally substituted aryl, $COOR_{41}$, $CONR_{42}R_{43}$, $S(O)_qR_{44}$, $SO_2NR_{45}R_{46}$ or $NR_{45a}R_{46a}$ where R_{41}, R_{42}, R_{43}, R_{44}, R_{45}, R_{46} R_{45a}, R_{46a}, are independently H or optionally substituted alkyl.

8. A method according to any preceding claim wherein R_6 is hydrogen, C_1-C_6alkyl or C_1-C_6haloalkyl; halogen, hydroxy, mercapto, cyano, C_1-C_6alkoxy, C_1-C_6alkylthio, amino, C_1-C_6alkylamino, di(C_1-C_6alkyl)-amino, -O-CO-R_{54}, -NH-CO-R_{53}, where R_{53} and R_{54}, are independently H or optionally substituted alkyl.

9. A compound of formula (I)



(I)

wherein

A and A' are both N or A and A' are both CH or A is CH and A' is N;

j is 0 or 1

R_1 is

a) hydrazino, that is unsubstituted or one- to threefold substituted by optionally substituted alkyl and/or optionally substituted acyl,

b) cyclohexylamino, tetrahydro-4H-pyranyl-4-amino, pyrrolidine-3-amino, 2- or 3-tetrahydro- furylamino, all optionally substituted by amino, hydroxy, alkoxy, alkyl or alkoxyalkyl,

c) piperazinyl that is optionally substituted by amino, amino-lower alkyl, hydroxy, alkoxy, alkyl or alkoxyalkyl,

d) morpholinyl that is optionally substituted by amino, amino-lower alkyl, hydroxy, alkoxy, alkyl or alkoxyalkyl,

e) amino or mono- or di-(lower alkyl)amino wherein the lower alkyl moieties are unsubstituted or substituted by one or more (preferably 1 to 3, especially 1 or 2) substitutents independently selected from the group consisting of unsubstituted amino, N-mono- or N,N-di-(lower alkyl)-amino, (lower alkoxy)-lower alk-oxy, lower alkoxycarbonylamino, hydroxy-lower alkoxycarbonylamino, lower alkoxy-lower alkoxycarbonylamino, morpholinyl, hydroxy-lower alkylamino, cyano, halogen, oxo, hydroximino, alkoximino, optionally substituted hydrazono, lower alkenyl, lower alkynyl, guanidyl, lower alkanoylamino, hydroxy-lower alkanoylamino, lower alkoxy-lower alkanoylamino, halo-lower alkanoylamino, lower alkylaminocarbonylamino, hydroxy-lower alkylaminocarbonylamino, lower

alkoxy-lower alkylaminocarbonylamino, amidino, di-lower-alkylamino-cyclohexyl, carboxy, lower alkoxycarbonyl, hydroxy-lower alkoxycarbonyl, lower alkoxy-lower alkoxycarbonyl, lower alkylcarbonyldioxy (= lower alkoxycarbonyloxy), hydroxy-lower alkoxycarbonyloxy, lower alkoxy-lower alkoxycarbonyloxy, lower alkanoyloxy, halo-lower alkanoyloxy, hydroxy-lower alkanoyloxy, lower alkoxy-lower alkanoyloxy, carbamoyl, N-mono- or N,N-di-lower alkylcarbamoyl, N-(hydroxy-lower alkyl)carbamoyl, N-lower alkyl-N-hydroxy-lower alkyl-carbamoyl, N,N-di-(hydroxy-lower alkyl)-carbamoyl, N-hydroxy-carbamoyl, hydroxy, lower alkoxy, lower alkenyloxy, lower alkinyloxy, lower haloalkoxy, lower alkylthio, lower alkylsulfoxyl, lower alkylsulfonyl, lower alkoxysilyl, 4-tetrahydro-4H-pyranyl, 3-pyrrolidinyl, 2- or 3-tetrahydrofuryl, 2- or 3-dihydrofuryl, piperazinyl, lower alkanoyl-piperazinyl (including formylpiperazinyl), optionally substituted heteroaryl and optionally substituted heteroaryloxy,

f) optionally substituted alkanoylamino, optionally substituted alkenoylamino, optionally substituted alkynoylamino, optionally substituted mono- or di-alkylaminocarbonylamino, optionally substituted alkoxycarbonylamino, optionally substituted mono- or di-alkylaminosulfonylamino, optionally substituted mono- or di-alkylaminosulfoxylamino,

g) N-(optionally substituted alkyl)-N-(optionally substituted lower alkanoyl)-amino,

h) N-(optionally substituted alkyl)-N-(optionally substituted alkoxycarbonyl)-amino,

i) N-(optionally substituted alkyl)-N-(N′,N′-mono- or di-[optionally substituted alkyl]-aminocarbonyl)-amino,

j) N=C(R_7,R_8) wherein R_7 is hydrogen, alkyl, amino, mono- or di-alkylamino and R_8 is amino, mono- or dialkylamino or wherein R_7 and R_8, together with the binding carbon atom, form a saturated five- to seven-membered ring with 0, 1 or 2 ring nitrogen atoms that is optionally substituted by one or more substituents, preferably 1 to 3 substituents, especially lower alkyl,

k) an optionally substituted 4 to 7 membered heterocyclyl group containing one or two nitrogen, oxygen or sulfur atoms but at least one nitrogen atom through which the heterocyclyl ring is attached to the remainder of the molecule;

R_2 is hydrogen, C_1-C_4-alkyl, C_3-C_4-alkenyl, C_3-C_4-alkynyl, -CH_2OR_{16}, -CH_2SR_{16}, -$C(O)R_{16}$,-$C(O)OR_{16}$, SO_2R_{16}, SOR_{16} or SR_{16}

where R_{16} is C_1-C_8-alkyl, C_1-C_8-alkoxyalkyl, C_1-C_8 haloalkyl or phenylC_1-C_2-alkyl,

wherein the phenyl may be substituted by up to three groups selected from halo or C_1-C_4-alkyl;

R_3 is hydrogen, halogen, C_1-C_4alkyl, C_1-C_4haloalkyl, C_1-C_4haloalkoxy; hydroxy, mercapto, cyano or C_1-C_4alkoxy;

R_4, R_5 and R_6 are independently of each other hydrogen, halogen, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted aryl, optionally substituted heteroaryl, optionally substituted alkoxy, optionally substituted acyloxy, optionally substituted alkenyloxy, optionally substituted alkynyloxy, optionally substituted aryloxy, optionally substituted heteroaryloxy, optionally substituted acylamino, optionally substituted thioalkyl, $COOR_{17}$, $CONR_{18}R_{19}$, $S(O)_kR_{20}$, $SO_2NR_{21}R_{22}$, $NR_{23}R_{24}$, $NR_{25}SO_2R_{26}$, NO_2, CN, $C(=O)R_{27}$, $C(=NOR_{28})R_{29}$ or R_4 and R_5 or R_5 and R_6 together form a five to six –membered saturated or unsaturated carbocyclic ring system or ring system or a five to six –membered heteroaromatic or heterocyclic ring system which is optionally substituted and contains one to three heteroatoms selected from O, N or S;

k is 0, 1 or 2 and

R_{17}, R_{18}, R_{19}, R_{20}, R_{21}, R_{22}, R_{23}, R_{24}, R_{25}, R_{26}, R_{27}, R_{28} and R_{29} are independently H or optionally substituted alkyl or optionally substituted aryl; or a salt thereof provided that a) when A is CH, A' is N and R_3, R_5 and R_6 are all H then R_4 is not hydrogen, halogen, alkoxy, haloalkyl, haloalkoxy or alkyl; b) when A is CH and A' is N then R_1 is not an optionally substituted N-linked 5- or 6- membered heterocyclyl group containing two adjacent nitrogen atoms as the only heteratoms in the heterocycyclic ring; c) when A is CH, A' is N and R_4 and R_5 are both H then R_3 is not hydrogen, halogen, lower alkoxy or lower alkyl; and d) when A is N, A' is N and R_2 is H and one of R_3, R_4, R_5 and R_6 is halogen, nitro, alkoxy, haloalkyl or haloalkoxy then R_1 is other than aminoalkylamino, hydroxyalkylamino, optionally substituted morpholino, optionally substituted piperidino, optionally substituted piperazino, pyridylalkylamino, alkenylamino, optionally substituted phenylamino, pyrrolidinialkylamino, and pieridinoalkylamino.

10. A compound according to claim 9 wherein A is CH and A' is N.

11. A compound according to claim 9 or claim 10 wherein R_1 is

a) hydrazino substituted by one to three substituents independently selected from the group consisting of C_{1-4} alkyl, C_{1-4} haloalkyl, C_{1-4} hydroxyalkyl, C_{1-4} alkoxyC_{1-4} alkyl and C_{1-4} acyl;

b) cyclohexyl-amino substituted by amino;

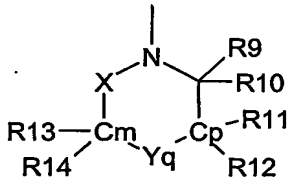
c) piperazinyl optionally substituted by one or two C_{1-4} alkyl, acyl or C_{1-4} aminoalkyl groups;

d) morpholinyl optionally substituted by one or two C_{1-4} alkyl, acyl or C_{1-4} aminoalkyl groups; mono- or di-(lower alkyl)-amino;

e) mono- or di-(lower alkyl)-amino where the lower alkyl moieties are independently substituted by N-mono- or N,N-di-(lower alkyl)amino, (lower alkoxy)-lower alkoxy, caboxy-lower alkyl, lower alkoxy, hydroxy, hydroxy-lower alkylamino, lower alkylamino-carbonylamino or lower alkoxycarbonylamino or C_{1-8} alkoximino;

j) $N=CR_7R_8$ where R_7 and R_8 together with the carbon atom to which they are attached form a five- to seven-membered ring with 2 ring nitrogen atoms adjacent to the carbon atom double bonded to the external N atom;

k) the moiety



wherein

the sum of (m + p) together is 0, 1, 2 or 3;

q is 0 or 1, and the sum of (m + p + q) together is 1, 2, 3 or 4;

R_9 is hydrogen, C_1-C_6-alkyl, C_1-C_6-haloalkyl or C_1-C_6-alkoxy;

R_{10} is hydrogen, C_1-C_6-alkyl, C_3-C_4-alkenyl or C_3-C_4-alkynyl;

each of R_{11}, R_{12}, R_{13} and R_{14} is, independently of the others, hydrogen, C_1-C_6-alkyl, C_1-C_6-haloalkyl, hydroxy-C_1-C_6-alkyl or C_1-C_6-alkoxy-C_1-C_6-alkyl, or the ring members $CR_{13}R14_4$ or $CR_{11}R_{12}$ or CR_9R_{10} are independently of each other a carbonyl group (C=O) or a group C=S;

X is C=O, C=S, S=O or O=S=O;

Y is O, S, C=O, CH_2, -N(R_{15})-, -O-N(R_{15})- , -N(R_{15})-O- or -NH-; and

R_{15} is C_1-C_8-alkyl, C_1-C_8-alkoxyalkyl, C_1-C_8 haloalkyl or phenylC_1-C_2-alkyl wherein the phenyl may be substituted by up to three groups selected from halo or C_1-C_4-

alkyl.

12. A compound according to any any one of claims 9 to 11 wherein R_2 is hydrogen, C_3-C_4-alkenyl, C_3-C_4-alkynyl, -CH_2OR_{16}, CH_2SR_{16}, -C(O)R_{16} ,-C(O)OR_{16}, , SOR_{16} or SR_{16} where R_{16} is as defined in claim 1.

13. A compound according to any one of claims 9 to 12 wherein R_3 is H, OH, halogen, methyl, ethyl, methoxy, ethoxy or CN.

14. A compound according to any one of claims 9 to 13 wherein R_4 is hydrogen, halogen, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkinyl, optionally substituted alkoxy, optionally substituted alkenyloxy, optionally substituted alkynyloxy, optionally substituted thioalkyl optionally substituted aryl, $COOR_{17}$, $CONR_{18}R_{19}$, $S(O)_kR_{20}$, $SO_2NR_{21}R_{22}$ or $NR_{23}R_{24}$ where R_{17}, R_{18}, R_{19}, R_{20}, R_{21}, R_{22}, R_{23} and R_{24} are H or C_{1-4} alkyl.

15. A compound according to any one of claims 9 to 14 wherein R_5 is hydrogen, halogen, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkinyl, optionally substituted alkoxy, optionally substituted alkenyloxy, optionally substituted alkynyloxy, optionally substituted thioalkyl optionally substituted aryl, $COOR_{41}$, $CONR_{42}R_{43}$, $S(O)_qR_{44}$, $SO_2NR_{45}R_{46}$ or $NR_{45a}R_{46a}$ where R_{41}, R_{42}, R_{43}, R_{44}, R_{45}, R_{46} R_{45a}, R_{46a}, are independently H or optionally substituted alkyl.

16. A compound according to any one of claims 9 to 15 wherein R_6 is hydrogen, C_1-C_6alkyl or C_1-C_6haloalkyl; halogen, hydroxy, mercapto, cyano, C_1-C_6alkoxy, C_1-C_6alkylthio, amino, C_1-C_6alkylamino, di(C_1-C_6alkyl)-amino, -O-CO-R_{54}, -NH-CO-R_{53}, where R_{53} and R_{54}, are independently H or optionally substituted alkyl.

17. A composition for controlling and protecting against phytopathogenic microorganisms, comprising a compound of formula I according to claim 9 as active ingredient together with a suitable carrier.

18. The use of a compound of formula I according to claim 1 in protecting plants against infestation by phytopathogenic microorganisms.

19. A method according to any one of claims 1 to 8, wherein the phytopathogenic microorganisms are fungal organisms.